3

BISBEE MUNICIPAL AIRPORT
Bisbee, Arizona

AIRPORT MASTER PLAN - 1999
AIRPORT FACILITY REQUIREMENTS

GENERAL REQUIREMENTS AND CRITERIA

Any growth in local aviation related activities or change in existing or anticipated use of an airport facility requires a corresponding program of airport development and implementation. This is necessary in order to assure that the facility remains able to effectively accommodate its demand and to effectively serve its market. In order to provide for the demands on the Bisbee Municipal Airport, a schedule of facility improvements has been developed, based on an inventory of the existing airport facilities and the development of forecast aircraft activity through the twenty-year planning period.

The recommendations for each of the airside and landside facilities were developed accepting the following criteria:

- The dimensional standards and design criteria for all improvements proposed within the planning period shall be as detailed in FAA Advisory Circular AC 150/5300-13, Airport Design and the Arizona Department of Transportation's (ADOT) Transportation Board Policies, 1998 Edition. A printout from the FAA's Airport Design program is included at the end of this section (pages FAA-1 through FAA-4). Excerpts from the ADOT Transportation Board Policies is also included (see pages ADOT-1 through ADOT-3). This includes criteria for the existing and ultimate airport configurations.

- The existing critical aircraft is a mix of ARC B-I and B-II piston single and twin engined types, and some ARC B-II jets and turboprops, as detailed in Section 2. Immediate and Short Term improvements should be designed to serve ARC B-II aircraft, with consideration for possible future expansion to serve an increase in activity by larger and/or heavier ARC B-II aircraft.

The following narrative contains a discussion of each recommended item of development.

The discussion of each element includes recommendations for improvements to meet the Short Term (2000-2005), and the Ultimate Term (2006-2020) demand. The Ultimate Term program includes alternate recommendations for potential expansion of the airport to serve a greater range of aircraft. Recommendations for action in a subset of the Short Term, the Immediate Term (2000-2002) are also included when a deficiency has been defined which requires immediate correction for reasons of safety, or when a feature was found to be not able to fulfill its design function at the present levels of demand.

Summary tables for the recommended Short Term, Immediate Term subset, and Ultimate Term development are included at the end of this section. These general recommendations have been expanded into detailed year-by-year project recommendations in Section 6, Airport Layout & Development Phasing Plan.

INSTRUMENT APPROACHES AND NAVIGATIONAL AIDS

The Bisbee airport is equipped with a Non Directional Beacon (NDB) that is currently out of service. This facility will require commitment of substantial financial resources in order to rehabilitate it. When the NDB was in operation, it was commissioned for VFR only use. In the very best case (with no obstructions, site or airspace constraints), an instrument approach based on an NDB will probably have very restrictive decent and visibility minimums, probably in the range of 600' to 800' of ceiling and one mile visibility. Site and terrain restrictions would increase these values, possibly up to marginal VFR ceiling requirements (1,000' ceiling).

At the present time the FAA is establishing Global Positioning System (GPS) approaches as "overlay" procedures at airports with existing approaches to ground-based navaids. If the Bisbee NDB were repaired and approved for IFR use, a GPS overlay could probably be commissioned. However, the GPS procedure would carry the same restrictive minimums as the NDB approach.

Airspace Considerations

Cochise County is bounded on the south by the U.S./Mexico international border, which is paralleled by the Contiguous U.S. Air Defense Identification Zone (ADIZ).

The southern half of the County is overlain by several Military Operations Areas (MOA's) and Restricted Areas, which are used extensively for Air Force and Air National Guard training operations. The Bisbee Municipal Airport is located beneath the Tombstone C MOA, which extends from 14,500' MSL up to, but not including Flight Level 180 (18,000' MSL). This MOA does not significantly affect operations arriving and departing from the airport. However, there are other considerations which affect the consideration of a useable instrument approach for the airport.

Bisbee Municipal Airport is located about 1½ nautical miles north of the U.S./Mexico border (and the Air Defense Identification Zone, or "ADIZ"). Aircraft departing to the south may enter Mexican airspace. The R-2303C Restricted Area is only 7 miles to the west.

Geographic Constraints, Terrain, and Compatible Land Use

Cochise County's terrain consists of several mountain chains separated by broad valleys. The western boundary of the County passes through the Whetstone Mountains and Apache Peak (elevation 7,711'). The southwestern corner of the County contains the Huachuca Mountains, with peak elevations ranging between 7,275' and 9,466'. The Bisbee-Warren area is dominated by the Mule Mountains, with peaks at 7,180' and 7,370'.

The defining feature of eastern Cochise County is the Chiricahua Mountains, which rise to an elevation of 9,759'. The Sulphur Springs Valley extends north and northwest from the U.S./Mexico border for more than 100 miles. Bisbee Municipal Airport is at 4,804' MSL. The valley floor in the Douglas area is at 4,000' MSL.

The Bisbee Municipal Airport is located less than 5 miles south and west of rapidly rising terrain (the Mule Mountains). Aircraft departing north from the airport will pass directly over the mountain communities of Warren (3 miles north), and Bisbee (4 miles north). A "missed approach" procedure or an instrument departure to the north from Runway 35 would present a potential hazard. For instance, in order to attain a safe altitude of 1,000' above the community of Warren, an aircraft departing Bisbee to the north would need to achieve and maintain a rate of climb of nearly 1,000 feet per minute, or 575 feet per mile. Smaller aircraft operating at their gross weights may have difficulty achieving this rate, especially during the summer when temperatures frequently exceed 90° Fahrenheit.

Instrument Approach Capability

Of the three key airfields in the overlapping service area (Bisbee-Douglas International - or BDI, Douglas Municipal and Bisbee Municipal), only the BDI Airport has a published instrument approach procedure. Two are provided, both of which are of the "non-precision" variety, providing only horizontal guidance to the arriving aircraft. No electronic glideslope guidance is provided. The current procedure requires a minimum of one mile visibility (greater for faster aircraft) and a cloud ceiling of 500 feet above the ground for aircraft arriving under actual Instrument Meteorological Conditions (IMC).

Because of the very low incidence of actual IMC in the area, the BDI approach is mainly used for training. However, it also functions as an emergency field for aircraft destined for the other VFR airports in the area during adverse weather conditions.

The Bisbee Municipal Airport is constrained by rapidly rising terrain to the north, northwest and east, and by its proximity to the U.S./Mexico border and ADIZ. A

published instrument approach is probably not feasible at this site.

Recommendations

Short Term (2000-2005) Recommendations:

Immediate Term (2000-2001) Subset:

Rehabilitation of the existing NDB would be economically prohibitive considering its role as a VFR-only facility. The existing NDB should be decommissioned and removed.

PRIMARY RUNWAY REQUIREMENTS

The existing primary runway (Runway 17-35) is 5,900' long and 60' wide. It is surfaced with a 3/4" Asphaltic Concrete friction course (1988) over 2" of Asphaltic Concrete (1983), over a chip-sealed base consisting of 4" of Aggregate Base over 5" of Select Material (1978). A rubberized Chip Seal and crack sealing was applied in 1997.

The existing runway is adequate for Visual Flight Rules (VFR) operations only. 1,000' x 250' x 450' FAA Runway Protection Zones (RPZ's) are required for this type of activity. The RPZ's extend beyond the airport's current property lines. Land use control over the RPZ for the approach to Runway 17 provided by an existing Avigation Easement, but land use control of the RPZ for the approach to Runway 35 is not currently provided.

The existing runway is lighted with Medium Intensity Runway Lights (MIRL), which were installed in 1995.

According to FAA Advisory Circular AC 150/5300-13 Airport Design, a runway's "Declared Distances" are the distances that the airport owner declares available for an aircraft's takeoff and landing operations. The current Takeoff Distance Available (TODA), Landing Distance Available (LDA), and the Accelerate-Stop Distance Available (ASDA) for Runway 17-35 are 5,900 feet, the total surfaced runway length.

The previous section (Section 2. Forecasts of Aviation Activity) indicated that the present runway length of 5,900' is adequate to accommodate many single and twin engined piston aircraft and some jets and turboprops with takeoff weights of up to 12,500 pounds. If the pavement structure is strengthened, the runway will be able to also accommodate many larger aircraft with takeoff weights of up to 30,000 pounds. In order for the airport to be able to accommodate a greater range of these aircraft in the future, additional runway length has been considered. The analysis included in Section 2 suggests that a reasonable mix of 12,500 pound-or-less aircraft through ARC B-II could be accommodated by a 7,000' long runway. An acceptable range of aircraft with weights of up to (and over) 30,000 pounds could be accommodated by an 8,950' long runway. *However, because of the location of the City's existing sewage treatment lagoon expansion area directly north of Runway 17-35, this extension would not be economically feasible.*

recommends the following runway lengths for an airport at an altitude of 4,804' MSL, with a mean daily maximum temperature of 90° Fahrenheit (as calculated using the FAA's Airport Design computer software):

FAA AC 150/5325-4A Primary Runway Length Recommendations for Bisbee Municipal Airport

Small airplanes (12,500 pounds or less):	
with approach speeds of less than 30 knots	440 feet
with approach speeds of less than 50 knots	1,180 feet
Small airplanes with less than 10 passenger seats:	
75 percent of these small airplanes	4,500 feet
95 percent of these small airplanes	5,970 feet
100 percent of these small airplanes	6,190 feet
Small airplanes with 10 or more passenger seats	6,190 feet
Large airplanes of 60,000 pounds or less:	
75 percent of these large airplanes at 60% useful load	7,310 feet
75 percent of these large airplanes at 90% useful load	9,340 feet
100 percent of these large airplanes at 60% useful load	10,850 feet
100 percent of these large airplanes at 90% useful load	11,740 feet

Examination of the above table suggests that the Section 2 analysis of critical aircraft mix is supported by the FAA criteria. According to the FAA, nearly 95% of small aircraft with less than 10 passenger seats (those that are 12,500 pounds or less) would be accommodated by the present 5,900' runway. This utilization would be increased to 100% of these aircraft with the addition of a 300' long runway extension (total length would then equal 6,200'). A reasonable range of heavier aircraft (12,500 to 30,000 pounds, and some up to 60,000 pounds) could be accommodated by a further extension of 2,750' (total length would then equal 8,950').

FAA criteria recommends a 75' pavement width for ARC B-II runways. The present pavement width is 60'.

The rubberized Chip Seal that was applied in 1995 exhibits a tendency to lose aggregate. This is resulting in a financial burden on the City because of the cost of frequent sweeping. Loose aggregate on aircraft operational areas presents the hazard of damage to propellers, wing and tail surfaces, and the potential for ingestion into jet engines.

At the present time, Runway 17-35's graded shoulders have as much as a 4" drop from the pavement edge to the shoulder. FAA criteria specifies a maximum of a 1.5" drop. This condition is considered a hazard to aircraft that might leave the pavement.

Recommendations

Short Term (2000-2005) Recommendations:

Immediate Term (2000-2001) Subset:

The existing Runway 17-35 should be overlain with a 1½" to 2" Asphaltic Concrete surface course in order to remedy the loose aggregate problem and to increase the structural bearing strength of the runway. A 2" overlay should be assumed for planning purposes and project cost estimating. The resulting pavement section will then consist of 4¾" of Asphaltic Concrete over 4" of Aggregate base Course and 5" of Select Material. This will probably provide a pavement design that will exceed the requirements of a 30,000 pound aircraft. The 60' pavement width is adequate for the present use.

The runway should be marked for visual operations.

The runway shoulders should be regraded to ensure that a maximum of 1.5" exists between the pavement edges and the shoulder.

The City should secure avigation easements or purchase land for the outer portion of the RPZ on the approach end of Runway 35.

A 20:1 clear approach surface is recommended for both approaches. There are no known obstructions to air navigation, as determined by reference to the requirements of FAR Part 77.

Ultimate Term (2006-2020) Recommendations:

The present 5,900' runway length will most probably be adequate to to serve the projected future demands. If the potential demand on the airport justifies it in the future, the existing runway could be extended to a total length of 6,200' (a 300' extension).

The existing runway pavement width should be increased from 60' to 75'.

A 20:1 clear approach surface is recommended for both approaches. Any existing obstructions to air navigation, as determined by reference to the requirements of FAR Part 77, should be removed or lighted.

CROSSWIND RUNWAY REQUIREMENTS

The FAA recommends that a secondary (crosswind) runway be developed if the wind coverage on the primary runway is less than 95% (see FAA AC 150/5300-13, Change 4, paragraph 203. b.). A crosswind runway may also be justified based on specific local conditions.

Wind Data Analysis

The overall operational safety of an airport is affected by the direction of its runways in relationship to the prevailing wind. In general terms, smaller aircraft are affected more by wind, although wind conditions will affect operation of any aircraft to some degree. Crosswinds are often a contributing factor in light aircraft accidents. Therefore, orientation of the runway such that it is aligned with the prevailing wind for the greatest percentage of the time will add substantially to the safety and usefulness of the airport.

The *crosswind component* of wind direction and velocity is defined as the resultant vector which acts at right angles to the runway centerline, and is equal to the wind velocity multiplied by the sine of the angle between the wind direction and the runway direction.

Wind coverage is defined as the percentage of the time that the crosswind components are below an acceptable velocity. These acceptable velocities vary with the airport's design Airport Reference Code (ARC), as follows:

Acceptable Crosswind Components
for Various Airport Reference Codes (ARC)

ARC A-IV through D-VI	20.0 knots
ARC A-III, B-III, and C-I through D-III	16.0 knots
ARC A-II and B-II	**13.0 knots**
ARC A-I and B-I	**10.5 knots**

Source: FAA AC 150/5300-13, Appendix 1

The most desirable runway orientation based on wind is the one which has the greatest wind coverage. As was mentioned above, the FAA recommends a minimum wind coverage of 95%. If a single runway cannot meet this criteria, a crosswind runway is recommended, aligned such that the total wind coverage for the two runways will be at least 95%.

Digital wind data collected at the Bisbee-Douglas International Airport for the 1986

through 1996 period was used in the wind analysis for this study. The source of the data was the National Climatic Data Center in Asheville, North Carolina.

The Bisbee Municipal Airport's design Airport Reference Code is ARC B-II (see Section 2, Forecasts of Aviation Activity). However, the airfield will be used by a wide range of aircraft types, including those in the ARC A-I and B-I categories. Wind will potentially have the greatest effect on the safety of operations of these light aircraft.

In order to form an accurate basis for crosswind runway development recommendations, analysis of the all-weather data for both active runways (17-35 and 2-20) assuming an acceptable crosswind component of 13 and 10.5 knots. The runways were considered both separately and as a two-runway system.

The resulting wind coverages were computed using the FAA's Airport Design Wind Analysis software. The results of the computations are tabulated on the following pages.

Bisbee Municipal Airport
Results of Wind Data Analysis - All-Weather Conditions

Runway	Azimuth (True)	13-Knot Wind Coverage	10.5-Knot Wind Coverage
17	189.0633°	54.53%	52.18%
35	9.0633°	56.47%	54.85%
17-35		**95.66%**	**91.80%**
2		58.43%	56.85%
20		54.09%	52.52%
2-20		**97.28%**	**94.14%**
17-35 + 2-20		**98.20%**	**95.63%**

Wind Data Source: Records for Bisbee-Douglas International Airport 1986-1996.

(Calculations made using the FAA Wind Analysis Software)

The results of the wind data analysis indicate that a crosswind runway may be justified for aircraft in the 10.5 knot ARC A-I and B-I, since Runway 17-35 has coverage of only 91.80%. Based strictly upon the FAA guidelines, a crosswind runway will not be required to adequately serve the ultimate critical aircraft in the 13-knot ARC B-II category, because Runway 17-35 has 13-knot coverage of over 95% (95.66%).

There are presently no easements for protection of the Runway 2-20 RPZ's.

Recommendations

Short Term (2000-2005) Recommendations:

Immediate Term (2000-2001) Subset:

Avigation easements or fee land acquisition for the existing RPZ's for visual operations should be provided. The RPZ trapezoid dimensions should be 1,000' x 250' x 450'. A 20:1 clear approach surface is recommended.

Additional Short Term Recommendations:

Runway 2-20 is currently a graded dirt landing strip with a useable surface about 3,000' long. The runway is about 200' wide.

In order to provide a safer operating environment for light aircraft, which account for the majority of activity at Bisbee, Runway 2-20 should be extended and paved. The FAA recommends a crosswind runway length equal to 80% of the primary runway length. In order to conform to the FAA's criteria, the crosswind runway would have to be extended to a length of 4,720' (5,900' x 80%). However, because of the site constraints of rough terrain to the northeast of the airfield and Bisbee Junction Road to the southwest, the longest economically feasible runway length for Runway 2-20 is 3,900'.

Pavement should be designed to accommodate single-wheel geared aircraft of up to 12,500 pound takeoff weight. Recommended pavement width is 60'

Runway 2-20 should be marked for Visual operations.

Avigation easements or fee land acquisition for ultimate RPZ's for visual operations should be provided. The RPZ trapezoid dimensions should be 1,000' x 250' x 450'. A 20:1 clear approach surface is recommended.

Paved aircraft turnaround taxiways should be provided at the runway ends.

Ultimate Term (2006-2020) Recommendations:

Because its use will be primarily by lighter aircraft, the 3,900' length should be sufficient throughout the planning period. Medium Intensity Runway Lighting (MIRL) of Runway 2-20 should be programmed for development in the Ultimate Term.

TAXIWAYS

At the present time, the paved taxiway system consists of Runway 17-35's full parallel taxiway, connector taxiways A-1 through A-6, and the extension of Taxiway A-3 to the parking apron and terminal area.

Although pavement structural condition is good, the taxiways surface exhibits the same surface problem as Runway 17-35. The rubberized Chip Seal that was applied in 1995 exhibits a tendency to lose aggregate. Loose aggregate on aircraft operational areas presents the hazard of damage to propellers, wing and tail surfaces, and the potential for ingestion into jet engines.

At the present time, portions of the parallel taxiway's graded shoulders have as much as a 4" drop from the pavement edge to the shoulder. FAA criteria specifies a maximum of a 1.5" drop. This condition is considered a hazard to aircraft that might leave the pavement.

The taxiway system is not lighted, but is equipped with retroreflective edge markers that are in poor condition. Many of the units are missing or broken.

FAA criteria recommends a 35' pavement width for ARC B-II taxiways. The present pavement width conforms to this requirement.

The graded dirt taxiway to Runway 20 is in good condition, with a maintained width of 100'.

Recommendations

Short Term (2000-2005) Recommendations:

Immediate Term (2000-2001) Subset:

The existing paved taxiways should be overlain with a 1½" to 2" Asphaltic Concrete surface course in order to remedy the loose aggregate problem and to increase structural bearing strength. A 2" overlay should be assumed for planning purposes and project cost estimating. The resulting parallel and connector taxiway pavement section will consist of 4" of Asphaltic Concrete over 6" of Aggregate base Course.

The taxiway shoulders should be regraded to ensure that a maximum of 1.5" exists between the pavement edges and the shoulder.

Additional Short Term Recommendations:

The existing graded dirt taxiway to Runway 20 should be paved when Runway 2-20 is improved. A 35' pavement width is recommended.

Runway 17-35's parallel taxiway should extended 300' in order to serve the recommended Short Term runway extension.

The parallel and connector taxiways should be lighted with Medium Intensity Taxiway Lights (MITL).

Ultimate Term (2006-2020) Recommendations:
The taxiway to Runway 20 should be lighted with an MITL system concurrent with Runway 2-20 MIRL installation.

AIRCRAFT PARKING AND STORAGE REQUIREMENTS

The airport currently has a 270' x 265' asphaltic concrete surfaced aircraft parking apron. The apron has tiedowns to accommodate 28 aircraft. Pavement and tiedowns were found to be in good condition, but the apron pavement surface was found to exhibit the same loose aggregate condition as the runway and taxiways.

The number of required tiedown spaces for based and transient aircraft use was determined by applying the following criteria and assumptions.

- Approximately 84.7% of the total peak daily operations are assumed to be by transient aircraft at the present time. The forecasts indicate that this percentage of use may decrease to 82.7% by 2020.
- Most visiting aircraft will arrive and depart on the same day. The actual number of peak transient aircraft is assumed to be one-half the peak transient daily operations.
- Seventy-five percent of the transient aircraft will be parked on the apron at the same time during the peak period.
- Ten percent of the based aircraft may also be parked on the apron temporarily or seasonally.

The following calculations were made to derive the recommended number of tiedown spaces to be provided on the parking apron in the present and ultimate scenarios.

Where: D = Average Daily Peak Operations.
T = Total daily peak transient operations.
N = Number of required tiedowns for transients.
B = Number of based aircraft.
...and
S = Total number of recommended tiedowns.

For base year (2000) condition:

T = D (0.847) = 93(0.847) = 78.77
N = (T/2) 0.75 = (78.77/2)0.75 = 29.54
N = 30
S = (0.10 (B))+N = (0.10 (14))+30 = 31.4 = **31**

For Ultimate (2020) condition:

T = D (0.827) = 100(0.827) = 82.70
N = (T/2)0.75 = (82.70/2)0.75 = 31.01
N = 31
S = (0.10 (B))+N = (0.10(17))+31 = 32.7 = **33**

The existing hangars will accommodate 3 aircraft. The existing T-Shades will accommodate 9 aircraft, and are currently fully occupied. In the above estimates, it is assumed that most based aircraft owners will prefer to park their aircraft within a hangar or T-Shade, if available at a reasonable cost. For this reason, adequate land area for hangar and/or shade construction should be provided for all forecast based aircraft through the planning period (17 based aircraft by 2020). These may be constructed as required by private interests upon leased land, or by the City to provide a revenue-producing rental base.

The existing aircraft parking apron's 28 available spaces may be adequate to meet the needs throughout the twenty-year planning period, assuming that hangar and/or T-Shade space will be provided for based aircraft.

Recommendations

Short Term (2000-2005) Recommendations:

Immediate Term (2000-2001) Subset:

The existing parking apron should be overlain with a 1½" to 2" Asphaltic Concrete surface course in order to remedy the loose aggregate and to increase structural bearing strength. A 2" overlay should be assumed for planning purposes and project cost estimating.

Land should be set aside for future hangar development.

Additional Short Term Recommendations:

Additional T-Shades should be constructed to accommodate an additional 5 aircraft.

Ultimate Term (2006-2020) Recommendations:

Tee-Hangars should be constructed as dictated by actual demand.

A site should be prepared for development of a private Fixed Base Operator (FBO) hangar and apron.

at an estimate of the required Terminal Building area for the anticipated general aviation demands through the planning period. A basic criteria of 50 square feet of building space per peak hour passenger or pilot was applied to the assumed rate of 2.5 occupants per peak hour aircraft.

Using this criteria, the estimated minimum Terminal Building space for the base year (2000) time frame is (2.5)(50)(10) or 1,250 square feet. The projections for potential year 2020 activity are (2.5)(50)(11) or 1,375 square.

The existing Terminal Building is about 1,520 square feet in area. Roughly 1,007 square feet is used as the Airport Manger's residence. The remaining 513 square feet are used as public area, with two restrooms, a small lobby and the Airport Manager's office.

Recommendations

Short Term (2000-2005) Recommendations:
There are no Immediate Term (2000-2001) Subset recommendations.

The existing Terminal Building should be expanded to include a public use area of 1,375 square feet. Alternately, a new Terminal Building could be constructed and the existing structure could be used as the Airport Manager's residence and office.

The City should acquire computer hardware and software to be used for public weather data access and flight planning.

Ultimate Term (2006-2020) Recommendations:
The 1,375 square foot Terminal Building public area will be adequate throughout the planning period.

Existing Hangar, T-Shade & Storage Building Improvements

The City owns two hangars, the two T-Shade structures and the Quonset storage building in addition to the Terminal Building.

Building #2 is the Quonset-style storage building located at the north end of the auto parking area. This building was constructed in about 1980. Its floor slab, foundation and CMU walls were found to be in Good condition, but the roof is in need of rehabilitation since corrosion is evident on the steel roof framing members. Although this building has electrical service, it has been disconnected. The overhead vehicular door does not operate correctly and is in need of rehabilitation.

Two of the City owned structures, Hangar Buildings#3 and #4, were built in the early 1930's. These structures have some local historical significance, and might qualify for listing on the Register of Historic Places, but probably would not be eligible for Historic Preservation funding.

Hangar Building #3 is framed entirely out of 2" steel pipe, which is welded and cable-braced. Roofing and siding are corrugated steel. Although this building is wired, there is no separate service entrance or breaker panel. The steel pipe wall, roof and door framing members exhibit extensive corrosion and the door does not operate properly. Rehabilitation of this structure to bring it into conformance with current building and fire codes would be difficult.

Hangar Building #4 has a much better potential for rehabilitation. Although its wooden truss roof and side wall extensions show evidence of structural failure, the existing CMU walls and foundation are in good shape. The entire roof structure, corrugated metal roofing and siding, as well as the door could be replaced. The original appearance of the building could be maintained. Hangar #4's electrical and lighting system is in Good condition. However, the lights would require replacement when the roof is replaced.

The existing T-Shade structures (Buildings #6 and #7) were found to be in generally Good condition.

Recommendations

Short Term (2000-2005) Recommendations:
There are no Immediate Term (2000-2001) Subset recommendations.

Building #2, the Quonset Storage Building:
Apply new roofing materials as appropriate to seal the roof system.
Rehabilitate the existing steel roof framing structure.
Rehabilitate the existing electrical, lighting and heating systems.
Rehabilitate the existing overhead vehicular door.

Hangar Building #3:
It is recommended that this structure be demolished.

Hangar Building #4:
Remove and replace frame side wall extension, roof trusses, metal siding and roofing.
Replace the existing hangar door.
Replace interior overhead lighting.

Automobile Parking and Access Requirements

The Estimated Peak Hourly Demand was also used as a basis to estimate the projected requirements for automobile parking. The criteria used is a factor of 3.25 automobiles per peak hour operation. This factor allows for 2.5 occupants per aircraft operation during the peak hour, plus allowance for airport employees and visitors.

The estimated automobile parking requirements for the base year 2000 time frame is, therefore, (3.25)(10) or approximately 33 spaces. The year 2020 calculations are

(3.25)(11) or approximately 36 spaces.

The existing gravel auto parking area is located adjacent to the Terminal Building. In its present configuration it will accommodate about a dozen cars. There is presently one marked handicapped space.

Vehicular access to the airport is presently provided by a graded road.

Recommendations

Short Term (2000-2005) Recommendations:
There are no Immediate Term (2000-2001) Subset recommendations.

The automobile parking area should be paved and expanded such that it will accommodate 36 cars. The access road should also be paved.

Ultimate Term (2006-2020) Recommendations:
With the recommended Short Term improvements, the automobile parking and access road will be adequate throughout the planning period.

Airport Visual Aids

The existing visual aids include the Precision Approach Path Indicators (PAPI) on both Runway 17 and 35 approaches, the airport's rotating beacon on the Terminal Building, lighted taxiway guidance signs, and the lighted Wind Cone and Segmented Circle marker. All of these facilities are in Good condition, but some will require relocation if the runways are improved according to the above recommendations.

Recommendations

Short Term (2000-2005) Recommendations:
There are no Immediate Term (2000-2001) Subset recommendations.

The Runway 17 and/or 35 PAPI will require relocation when the Short Term 300' runway and taxiway extension is constructed. New lighted guidance signage will be required when the extension takes place. Existing guidance signage will also require modification and/or relocation at this time.

Ultimate Term (2006-2020) Recommendations:
The Ultimate Term Runway 17-35 and taxiway extensions will require relocation of existing PAPI's, as well as new lighted guidance signs and signage modifications.

New lighted taxiway guidance signage and PAPI systems should also be installed on Runway 2-20 concurrent with installation of an MIRL system.

AIRCRAFT FUEL SERVICE

The present fuel delivery and storage system, installed in 1995, provides 100LL aviation fuel. The tank's capacity is 10,000 gallons. Fuel sales between September of 1997 and January of 1999 totaled 7,141 gallons, and averaged 420.1 gallons per month. The Airport Manager has documented requests for Jet-A fuel from several potential airport users. These requests total approximately 7,200 gallons for the September, 1997 - January, 1999 period, or about 423 gallons per month.

Recommendations

Short Term (2000-2005) Recommendations:
There are no Immediate Term (2000-2001) Subset recommendations.

A new Jet-A fuel delivery and storage facility should be developed in the Short Term. A 12,000 gallon system similar to the existing 100LL system should be adequate. As an alternate, a fuel truck could be used for this purpose. An automated credit card controlled operating system should be considered.

Ultimate Term (2006-2020) Recommendations:
With installation of a Jet-A delivery and storage system, the fuel system will be adequate through the planning period.

FENCING

The existing airport property is enclosed by a barbed wire fence. The Terminal Area is equipped with chain link security fencing. The fence was replaced in 1995 and is in generally Good condition at the present time.

Recommendations

Short Term (2000-2005) Recommendations:
There are no Immediate Term (2000-2001) Subset recommendations.

Expansion of the Terminal Area improvements may require extension of the security fencing. This should occur concurrent with the related improvements.

Ultimate Term (2006-2020) Recommendations:
With the noted extension of security fencing, the system should be adequate throughout the planning period, assuming normal maintenance.

RECREATIONAL AIRPORT FACILITIES

In 1992, ADOT - Aeronautics developed the Arizona Recreational Airport Master Plan, which selected 18 possible airport sites that would be good locations for use as recreational sites. The intent was that the owners of the 18 airfields listed in the plan could apply to the state for grants for development of eligible recreational improvements. The Bisbee Municipal Airport was not included on the plan.

advantage of the funding for development of recreational facilities (Payson Airport, in north central Arizona). In order to generate more interest in the recreational airport program, ADOT plans to open the program up to other airport owners, who express interest in this type of development.

The Bisbee Municipal Airport Advisory Board has expressed interest in the development of the Bisbee Municipal Airport as a recreational airport. The development would consist of a prepared, secure campsite area adjacent to the terminal area, with potable water available and restroom facilities.

Recommendations

Short Term (2000-2005) Recommendations:
There are no Immediate Term (2000-2001) Subset recommendations.

Initially, a fenced camping area should be developed that could accommodate about a dozen camp sites. An adjacent restroom/shower building should be provided with potable water available and security lighting.

Ultimate Term (2006-2020) Recommendations:
Depending upon the actual demand for camping on the airport, the facilities may need to be expanded. Adequate land area should be set aside for this purpose that would be equal to twice the size of the initial campground.

UTILITIES: ELECTRICITY, WATER, SEWER, FIRE PROTECTION AND TELEPHONE

(To be added)

Recommendations

Short Term (2000-2005) Recommendations:

Ultimate Term (2006-2020) Recommendations:

rehabilitation of the Quonset Storage Building (#2) and Hangar Building (#4), and installation of security lighting. It is recommended that funds be programmed for "miscellaneous electrical improvements" for each one of these corresponding facility improvements and that the entire electrical system be inspected by an electrical engineer for potential upgrades to the system. Funds should be set aside for upgrades to the Terminal Area electrical system.

Telephone Service

Telephone service currently appears to be satisfactory; however, if an electrical engineer is hired to evaluate the electrical system, the engineer should also review the telephone system with the City of Bisbee and recommend upgrades if needed. A small budget should be included in the electrical budget as a contingency.

Terminal Area Sewer

The existing septic system is adequate for the terminal building and hangar restroom it serves. If the terminal building is expanded or a new terminal building is constructed, or if additional buildings are constructed, the septic system may need to be upgraded in a fashion corresponding to the buildings that are hooked up to it. It is recommended that the septic system be upgraded one time as needed, not piecemeal, to handle all of the potential facilities being recommended in this 20-year Master Plan.

Sewer Service for Proposed Campground

A septic tank and sewer pipe was installed in 1996 to serve a future campground restroom facility. This septic tank should be adequate for the campground within this planning period. The existence of seepage pits or a leach field connecting to the septic tank should be verified during the planning and design of the campground. Any missing parts of the septic system can be installed with the campground.

Water Service and Fire Protection

The existing domestic water system needs to be upgraded and there is no fire protection at the Airport. The Naco Fire District is planning on locating a fire truck at the Airport to provide some fire protection for the airport.

Recommendations

Short Term (2000-2005) Recommendations:

Immediate Term (2000-2001) Subset:

Upgrade the Terminal Area water service and supply system, as well as providing adequate fire protection. This should be programmed to coincide with the Naco Fire District's installation of a 10,000 gallon fire protection water tank.

Additional Short Term Recommendations:

The Terminal Area electrical service and telephone systems should be upgraded.

Upgrade the Terminal Area sewer system.

Ultimate Term (2006-2020) Recommendations:
Installation of an additional 7.5 KW regulator is recommended, based upon the actual loads imposed by future runway and taxiway lighting improvements.

General Development Phasing Plan Summary

The tables on the following pages are a summary of the general recommendations for facility improvements to be constructed within the Short Term, Immediate Term subset, and the Ultimate Term time frames.

Alternate methods for execution of the recommended major improvements are presented in Section 4, Development Alternates.

The general development plan as presented in this section has been refined and is presented in greater detail in Section 6: Airport Layout & Development Phasing Plan. Estimated costs for the recommended development are presented in Section 7: Financial Plan.

GENERAL DEVELOPMENT PLAN
Bisbee Municipal Airport - Bisbee, Arizona

SHORT TERM - IMMEDIATE TERM SUBSET
2000-2002

1.	**Instrument Approaches and Navaids:**	Decommission and remove the existing Non Directional Beacon (NDB).
2.	**Primary Runway:**	Overlay Runway 17-35 (2" Asphaltic Concrete) and mark for visual operations. Regrade Runway 17-35 shoulders. Acquire avigation easement for the outer portion of the Runway 35 approach RPZ.
3.	**Crosswind Runway:**	Acquire avigation easements for the existing Runway 2-20 approaches.
4.	**Taxiways:**	Overlay the existing paved taxiways (parallel and taxiways A-1 through A-6) with 2" of Asphaltic Concrete. Regrade the parallel taxiway shoulders.
5.	**Aircraft Parking & Storage:**	Overlay the existing paved parking apron with 2" of Asphaltic Concrete. Set aside adequate land for future hangar development (accomplished through ALP preparation - see Section 6).
6.	**Other Buildings:**	Designate a Fixed Base Operator (FBO) hangar development area (accomplished through ALP preparation - see Section 6).
7.	**Utilities:**	Upgrade the Terminal Area water service and supply system.

GENERAL DEVELOPMENT PLAN
Bisbee Municipal Airport - Bisbee, Arizona

ADDITIONAL SHORT TERM RECOMMENDATIONS
2000-2005

1.	**Crosswind Runway:**	Pave Runway 2-20 and extend to a total length of 3,900' and 60' wide. Pavement should be designed to accommodate 12,500# aircraft. Mark Runway 2-20 for visual operations. Acquire avigation easements and fee land for Runway 2-20 extension and protection of the FAR Part 77 surfaces. Construct paved turnaround taxiwayss at both runway ends.
2.	**Taxiways:**	Pave the existing dirt taxiway to Runway 20 (35' width). Install Medium Intensity taxiway Lights (MITL) on existing taxiways serving Runway 17-35.
3.	**Aircraft Parking and Storage:**	Construct additional T-Shades to accommodate 5 additional aircraft.
4.	**Terminal Building:**	Construct 1,375 square foot Terminal Building expansion, or new Terminal Building.
5.	**Other Buildings:**	Rehabilitate the existing Quonset Storage Building (Building #2). Demolish Hangar Building #3. Rehabilitate Hangar Building #4.
6.	**Automobile Parking and Access Road:**	Pave and expand the existing auto parking area to accommodate a total of 36 cars. Pave the existing Access Road.
7.	**Fuel Storage and Delivery:**	Develop a new 12,000 gallon Jet-A fuel storage and delivery facility and card control system for both the Jet-A and 100LL delivery systems.
8.	**Fencing:**	Extend terminal area security fencing.
9.	**Airport Recreational Facilities:**	Develop a fenced airport campground with restroom/shower building, security lighting and potable water.
10.	**Utilities:**	Upgrade the Terminal Area electrical and telephone service. Upgrade the Terminal Area sewer system.

GENERAL DEVELOPMENT PLAN
Bisbee Municipal Airport - Bisbee, Arizona

ULTIMATE TERM RECOMMENDATIONS
2006-2020

1.	**Primary Runway:**	Widen Runway 17-35 pavement from 60' to 75'.
2.	**Crosswind Runway:**	Install an MIRL system on Runway 2-20.
3.	**Taxiways:**	Install MITL on the Runway 2-20 taxiways.
4.	**Aircraft Parking & Storage:**	Construct Tee-hangars and prepare sites for private hangar development. Prepare an FBO hangar and apron development site.
5.	**Visual Aids:**	Install new PAPI systems on the Runway 2 and 20 approaches.
6.	**Utilities:**	Install an additional 7.5KW regulator when required by actual demand by airside lighting upgrades and extensions.

FEDERAL AIR REGULATIONS: PART 139 COMPLIANCE

Federal Air Regulations, Part 139 governs the certification and operation of airports served by scheduled and unscheduled air carrier aircraft with seating capacities of more than 30 passengers. These regulations specifically address crash, fire and rescue operations, refueling safety, snow and ice control, wildlife hazard management, pavement maintenance, and required runway and taxiway marking, signage and lighting.

There is an interest in the possibility of establishing an air carrier or charter service at the Bisbee airport. The activity would consist of operations by Short SC.7 or 300-series aircraft. The following is a description of the Part 139 compliance requirements that would govern such an operation at Bisbee.

Crash, Fire and Rescue Operations

Under Part 139, an airport is assigned an ARFF (Air Rescue and Fire Fighting) index. This index is determined by a combination of two factors: 1) the physical length of the aircraft serving the airport; and 2) the average number of daily departures of air carrier aircraft in a single index group, calculated during the busiest three months of the previous year (or upon projections, for new installations).

The ARFF Index Groups are as follows:

Index A: Includes aircraft less than 90 feet in length.
Examples: Short SC.7 (40.08')
Short 330 (58.00')
Saab 340A (64.67')
Short 360 (70.83')

Index B: Includes aircraft at least 90 feet but less than 126 feet in length.
Examples: Douglas DC-9-30 (119.33')
Airbus A-320-100 (123.3')

Index C: Includes aircraft at least 126 feet but less than 159 feet in length.
Examples: Boeing 757-200 (154.08')
Boeing 767-200 (155.00')

Index D: Includes aircraft at least 159 feet but less than 200 feet in length.
Examples: Lockheed L1011 (177.67')
Boeing 767-300 (180.25')

Index E: Includes aircraft at least 200 feet in length.
Examples: MDC-MD-11 (201.3')
Boeing 747-100 (231.8')

Generally, the ARFF index for an airport is determined by the following:

a) If there are 5 or more average daily departures of air carrier aircraft in a single Index group, the longest Index group with an average of 5 or more daily departures is applied.

b) If there are less than 5 average daily departures of air carrier aircraft in a single Index group, the next lower Index is applied. The minimum Index is "A".

Specific equipment requirements are mandatory for each ARFF index and, under the regulations, an airport may not fall below the minimum equipment requirements for more than 48 hours before air carrier operations must be reduced to the next lowest rating.

If the Bisbee Municipal Airport experiences demand by ARC B-II aircraft such as the Short 360 or SC.7, it would be assigned an ARFF index rating of "A". Airports with this ARFF index must have at least one crash, fire and rescue vehicle carrying at least 500 pounds of sodium-based dry chemical or halon 1211, or 450 pounds of potassium-based dry chemical and water to total 100 gallons of aqueous film forming foam agent (AFFF) for simultaneous dry chemical and AFFF application.

At least one vehicle must be able to respond to the midpoint of the farthest runway within three minutes. The remaining vehicle(s) must be able to respond to the same point within four minutes.

Regarding crash, fire and rescue operations, Part 139 also requires the following:

1) All rescue and fire fighting personnel must participate in at least one live-fire drill every 12 months.

2) At least one fire fighting person who has been trained and is current in emergency medical care must be on duty during air carrier operations.

3) A full-scale airport emergency drill must be conducted at least once every three years.

4) A detailed emergency plan must be included in the airport's certification manual. This must be reviewed annually.

5) All roads that are designated for use as emergency access roads for ARFF vehicles must be identified in the certification manual and maintained in a condition that will support those vehicles during all weather conditions.

Aircraft Fueling Operations

Part 139 requires airports to establish and maintain acceptable standards for protecting against fire and explosions in storing, handling and dispensing of fuel and other hazardous materials. The airport owner must inspect the facilities of each fueling agent operating on the airport at least once every three months to assure compliance with mandated safety procedures.

In addition, at least one supervisor at each refueling operation must complete an aviation fuel training course in fire safety, with the curriculum outlined in Part 139. All other employees who handle fuel must receive at least on-the-job training in fire and fuel handling safety from that supervisor.

Each airport fueling operator must certify to the airport owner annually that all required training has been given.

Snow and Ice Removal

Part 139 specifies that, at airports where snow and icing conditions regularly occur, a snow and ice control plan must be prepared and implemented, as a part of the certification manual.

Wildlife Hazard Management

When wildlife or birds have access to the airport flight pattern or operations areas, an ecological study must be conducted to analyze the problem. This study is usually conducted by the federal Department of Agriculture, through the Federal Aviation Administration.

Implementation of a wildlife management plan may be required by the FAA, depending upon the outcome of the ecological study.

Pavement Maintenance

Part 139 airports are required to maintain and promptly repair the pavement of air carrier-use runways, taxiways and aircraft loading ramps and parking aprons. This includes holes which are larger than five inches in diameter with a slope greater than 45 degrees and/or a depth of greater than three inches. Pavement cracks which are large enough to affect the directional control of aircraft must be repaired also, and in no case may there be an elevation differential of greater than 3 inches between abutting pavement sections or between a full strength pavement and abutting shoulder.

Runway Marking and Signage

Part 139 requires that the airport must provide and maintain the following signing and marking features, if applicable to the type of approach offered:

1) Runway markings sufficient for the approach with the lowest minimums authorized for each runway;

2) Taxiway center line and edge markings;

3) Approved signs identifying taxiing routes on the movement areas;

4) Runway hold markings and approved signs at intersections;

5) ILS critical area markings or signs.

6) Distance-to-go signage for air carrier runways.

Airport Lighting

Part 139 certified airports must also provide and maintain the following lighting elements:

1) Runway edge lighting for the approach with the lowest minimums authorized for each runway;

2) Taxiway centerline or edge lighting, or reflectors for all air carrier-use taxi routes;

3) A rotating beacon;

4) Approach lighting for the approach with the lowest minimums authorized for each runway, unless this is provided and maintained by the FAA or another agency;

5) Obstruction marking and lighting, as appropriate.

Exemptions

Exemptions: Part 139 provides that the airport owner may apply for an exemption from any of its requirements, based upon the grounds that compliance would be unreasonably costly, burdensome, or impractical.

Management Staff Qualifications and Additional Part 139 Improvements

The present airport management staff are either fully qualified and certificated or are in the process of training to enable the Bisbee airport to be Part 139 certificated.

A review of the Part 139 requirements for the airport's operational areas (as presented above) indicates that the following improvements may be necessary for the airport to be Part 139 certificated:

1. Taxiway edge markings, in accordance with AC 150/5340-1G.
2. Taxiway edge lighting (Medium Intensity Taxiway Lighting system - MITL).
3. Runway 17-35 Distance-to-go signage, in accordance with AC 150/5340-18C.
4. Hold signs at runway/taxiway intersections, in accordance with AC 150/5340-18C.
5. Runway shoulder grading to ensure that there is no more than a 1½" drop from any pavement edge to the shoulder.

Item #1 will consist of application of paint markings on all taxiways serving the air carrier runway(s).

Item #2 is included in the *General Short Term Recommendations - 2000-2005* for taxiways serving Runway 17-35. If it is assumed that Runway 17-35 will be the designated air carrier runway, this lighting should suffice to satisfy the Part 139 requirements.

If it is assumed that Runway 17-35 will be the designated air carrier runway, the Distance-to-go signage (Item #3) could be limited to Runway 17-35.

Item #4 would require installation of additional lighted signs at each hold line for all taxiway intersections with the designated air carrier runway.

Runway shoulder grading (Item #5) has been programmed in the *Short Term - Immediate Term Subset - 2000-2002*.

A separate estimate for these Part 139 requirements is included in Section 7, Financial Plan.

AIRPORT DESIGN AIRPLANE AND AIRPORT DATA
VISUAL FLIGHT RULES (VFR) OPERATIONS

Aircraft Approach Category B
Airplane Design Group II

Airplane wingspan	78.99 feet
Primary runway end approach visibility minimums are visual exclusively	
Other runway end approach visibility minimums are visual exclusively	
Airplane undercarriage width (1.15 x main gear track)	0.00 feet
Airport elevation	4804 feet

RUNWAY AND TAXIWAY WIDTH AND CLEARANCE STANDARD DIMENSIONS

	Airplane Group/ARC	
Runway centerline to parallel runway centerline simultaneous operations when wake turbulence is not treated as a factor:		
VFR operations with no intervening taxiway		700 feet
VFR operations with one intervening taxiway		700 feet
VFR operations with two intervening taxiways		700 feet
IFR approach and departure with approach to near threshold		2500 feet less 100 ft for each 500 ft of threshold stagger to a minimum of 1000 feet.
Runway centerline to parallel runway centerline simultaneous operations when wake turbulence is treated as a factor:		
VFR operations		2500 feet
IFR departures		2500 feet
IFR approach and departure with approach to near threshold		2500 feet
IFR approach and departure with approach to far threshold		2500 feet plus 100 feet for each 500 feet of threshold stagger.
IFR approaches		3400 feet
Runway centerline to parallel taxiway/taxilane centerline	239.5	240 feet
Runway centerline to edge of aircraft parking	250.0	250 feet
Runway width		75 feet
Runway shoulder width		10 feet
Runway blast pad width		95 feet
Runway blast pad length		150 feet
Runway safety area width		150 feet
Runway safety area length beyond each runway end or stopway end, whichever is greater		300 feet
Runway object free area width		500 feet
Runway object free area length beyond each runway end or stopway end, whichever is greater		300 feet
Clearway width		500 feet
Stopway width		75 feet
Obstacle free zone (OFZ):		
Runway OFZ width		400 feet
Runway OFZ length beyond each runway end		200 feet
Inner-approach OFZ width		400 feet
Inner-approach OFZ length beyond approach light system		200 feet
Inner-approach OFZ slope from 200 feet beyond threshold		50:1
Inner-transitional OFZ slope		0:1

Runway protection zone at the primary runway end:

Width 200 feet from runway end	500 feet
Width 1200 feet from runway end	700 feet
Length	1000 feet

Runway protection zone at other runway end:

Width 200 feet from runway end	500 feet
Width 1200 feet from runway end	700 feet
Length	1000 feet

Departure runway protection zone:

Width 200 feet from the far end of TORA	500 feet
Width 1200 feet from the far end of TORA	700 feet
Length	1000 feet

Threshold surface at primary runway end:

Distance out from threshold to start of surface	0 feet
Width of surface at start of trapezoidal section	400 feet
Width of surface at end of trapezoidal section	1000 feet
Length of trapezoidal section	1500 feet
Length of rectangular section	8500 feet
Slope of surface	20:1

Threshold surface at other runway end:

Distance out from threshold to start of surface	0 feet
Width of surface at start of trapezoidal section	400 feet
Width of surface at end of trapezoidal section	1000 feet
Length of trapezoidal section	1500 feet
Length of rectangular section	8500 feet
Slope of surface	20:1

Taxiway centerline to parallel taxiway/taxilane centerline	104.8	105 feet
Taxiway centerline to fixed or movable object	65.3	65.5 feet
Taxilane centerline to parallel taxilane centerline	96.9	97 feet
Taxilane centerline to fixed or movable object	57.4	57.5 feet
Taxiway width	15.0	35 feet
Taxiway shoulder width		10 feet
Taxiway safety area width	79.0	79 feet
Taxiway object free area width	130.6	131 feet
Taxilane object free area width	114.8	115 feet
Taxiway edge safety margin		7.5 feet
Taxiway wingtip clearance	25.8	26 feet
Taxilane wingtip clearance	17.9	18 feet

REFERENCE: AC 150/5300-13, AIRPORT DESIGN.

AIRPORT DESIGN AIRPLANE AND AIRPORT DATA
INSTRUMENT FLIGHT RULES (IFR) OPERATIONS

Aircraft Approach Category B
Airplane Design Group II

Airplane wingspan	78.99 feet
Primary runway end approach visibility minimums are not lower than	1 mile
Other runway end approach visibility minimums are not lower than	1 mile
Airplane undercarriage width (1.15 x main gear track)	0.00 feet
Airport elevation	4804 feet

RUNWAY AND TAXIWAY WIDTH AND CLEARANCE STANDARD DIMENSIONS

	Airplane	Group/ARC
Runway centerline to parallel runway centerline simultaneous operations when wake turbulence is not treated as a factor:		
VFR operations with no intervening taxiway		700 feet
VFR operations with one intervening taxiway		700 feet
VFR operations with two intervening taxiways		700 feet
IFR approach and departure with approach to near threshold		2500 feet less 100 ft for each 500 ft of threshold stagger to a minimum of 1000 feet.
Runway centerline to parallel runway centerline simultaneous operations when wake turbulence is treated as a factor:		
VFR operations		2500 feet
IFR departures		2500 feet
IFR approach and departure with approach to near threshold		2500 feet
IFR approach and departure with approach to far threshold		2500 feet plus 100 feet for each 500 feet of threshold stagger.
IFR approaches		3400 feet
Runway centerline to parallel taxiway/taxilane centerline	239.5	240 feet
Runway centerline to edge of aircraft parking	250.0	250 feet
Runway width		75 feet
Runway shoulder width		10 feet
Runway blast pad width		95 feet
Runway blast pad length		150 feet
Runway safety area width		150 feet
Runway safety area length beyond each runway end or stopway end, whichever is greater		300 feet
Runway object free area width		500 feet
Runway object free area length beyond each runway end or stopway end, whichever is greater		300 feet
Clearway width		500 feet
Stopway width		75 feet
Obstacle free zone (OFZ):		
Runway OFZ width		400 feet
Runway OFZ length beyond each runway end		200 feet
Inner-approach OFZ width		400 feet
Inner-approach OFZ length beyond approach light system		200 feet
Inner-approach OFZ slope from 200 feet beyond threshold		50:1
Inner-transitional OFZ slope		0:1

Runway protection zone at the primary runway end:

Width 200 feet from runway end	500 feet
Width 1200 feet from runway end	700 feet
Length	1000 feet

Runway protection zone at other runway end:

Width 200 feet from runway end	500 feet
Width 1200 feet from runway end	700 feet
Length	1000 feet

Departure runway protection zone:

Width 200 feet from the far end of TORA	500 feet
Width 1200 feet from the far end of TORA	700 feet
Length	1000 feet

Threshold surface at primary runway end:

Distance out from threshold to start of surface	0 feet
Width of surface at start of trapezoidal section	400 feet
Width of surface at end of trapezoidal section	1000 feet
Length of trapezoidal section	1500 feet
Length of rectangular section	8500 feet
Slope of surface	20:1

Threshold surface at other runway end:

Distance out from threshold to start of surface	0 feet
Width of surface at start of trapezoidal section	400 feet
Width of surface at end of trapezoidal section	1000 feet
Length of trapezoidal section	1500 feet
Length of rectangular section	8500 feet
Slope of surface	20:1

Taxiway centerline to parallel taxiway/taxilane centerline	104.8	105 feet
Taxiway centerline to fixed or movable object	65.3	65.5 feet
Taxilane centerline to parallel taxilane centerline	96.9	97 feet
Taxilane centerline to fixed or movable object	57.4	57.5 feet
Taxiway width	15.0	35 feet
Taxiway shoulder width		10 feet
Taxiway safety area width	79.0	79 feet
Taxiway object free area width	130.6	131 feet
Taxilane object free area width	114.8	115 feet
Taxiway edge safety margin		7.5 feet
Taxiway wingtip clearance	25.8	26 feet
Taxilane wingtip clearance	17.9	18 feet

REFERENCE: AC 150/5300-13, AIRPORT DESIGN.

AIRPORT PLANNING GUIDELINES

I. BACKGROUND

Airport Planning Guidelines have been established by the State Transportation Board in order for the Aeronautics Division to accurately assess the limitations and deficiencies of airports in the State's Primary and Secondary Airport systems. These guidelines will be applied to airports in the Primary and Secondary system and evaluated periodically to determine the estimated statewide capital improvement costs required to bring the airports into compliance with the planning guidelines.

II. AIRPORT REFERENCE CODE

A. The FAA coding system for airports relates airport design criteria to the operational and physical characteristics of the airplanes intended to operate at an airport. The Airport Reference Code (ARC) consists of two components: Aircraft Approach Category and Airplane Design Group. The planning guidelines for airports in Arizona will be based on the FAA Airport Reference Code.

1. Aircraft Approach Category: The minimum approach speed of an aircraft at its maximum gross landing weight in the landing configuration.

2. Airplane Design Group: A grouping of airplanes based on wingspan.

III. AIRPORT PLANNING GUIDELINES FOR AIRPORTS IN AIRPORT REFERENCE CODE GROUP I:

These airports normally are designed to serve small aircraft, with operating gross weights of less than 12,500 pounds, capable of accommodating aircraft with less than 10 passengers with visual approaches to the runway(s).

A. Runway length and width: The minimum runway length and width will be determined by the predominant type of aircraft that operate at the airport and the approach visibility minimums at the airport. FAA Advisory Circular (AC) 150/5325-4, Runway Length Requirements for Airport Design and AC150/5300-13, Airport Design will be used to determine the appropriate runway dimensions.

B. Taxiways: A minimum of a Turnaround taxiway will be at both runway(s) ends.

C. Runway Safety Area: The runway safety area will be 120 feet wide centered on the runway centerline and a minimum length of 240 feet beyond the actual ends of the runway, in accordance with (IAW) FAA AC 150/5300-13.

D. The airport will have at least one windsock/wind indicator. This windsock should be lighted (if night operations are permitted) and located at/or near the runway midfield.

E. Both paved and unpaved airports should have a graded area for parking the based aircraft as well as at least two transient aircraft. All parking spaces should be equipped with a minimum of one tiedown. The location of the parking apron should be in accordance with FAA AC150/5300-13.

F. The airport should be free of obstructions in the primary, approach and transition surfaces in accordance with FAR Part 77, Objects Affecting Navigable Airspace. The minimum approach slope to the airport should be 20:1.

G. The airport should be equipped with Runway Delineators.

H. The airport should have a continuous access road to a paved city/town/county or state roadway system.

IV. AIRPORT PLANNING GUIDELINES FOR AIRPORTS IN AIRPORT REFERENCE CODE GROUP II:

These airports normally are designed to serve small to medium sized aircraft, with maximum gross weights of less than 25,000 pounds, accommodating less than 35 passengers. These airports will meet all of the minimum design standards of Group I and:

A. The airports with scheduled commercial passenger service will meet the minimum requirements of FAR Part 139.

B. Taxiways: These airports will have a minimum of a partial or full length parallel (mandatory for annual operations in excess of 20,000). If the runway is paved, the parallel taxiway should be paved. Runup areas should be provided at both ends of the runway(s).

C. The airports should be equipped with the following minimum navigational aids:

1. At least one lighted windsock/wind indicator located at/or near the midpoint of the runway.

2. A beacon.

3. Delineators or lighted runway and delineators on all taxiways.

4. An airport approach aid (Visual Approach Slope Indicator, Precision Approach Path Indicator, Generic Visual Glideslope Indicator) at those airports with more than 15,000 annual operations.

5. These airports should have the following Terminal services: a minimum of a telephone, access to weather data, access to FAA Flight Facilities, a waiting area, restroom facilities, portable fire extinguishers, and posted local area procedures/ emergency procedures. In the absence of fuel, eating and sleeping facilities, information should be available on where these accommodations can be obtained. NOTE: Terminal services may be provided by a Fixed Base Operator (FBO) and/or airport sponsor.

D. The airports should have a graded area for parking the based (non-hangared) aircraft as well as at least six transient aircraft at paved or unpaved airports. All apron parking spaces (paved/unpaved) should be equipped with at least three-point tiedowns. The location of the parking apron should be in accordance with FAA AC 150/5300-13.

E. The airports should be fenced.

V. AIRPORT PLANNING GUIDELINES FOR AIRPORTS IN AIRPORT REFERENCE CODE GROUP III, *IV and V*:

A. These airports normally are designed to serve small, medium and large sized aircraft, with maximum gross weights of less than up to 300,000 pounds, capable of accommodating aircraft with more than 35 passengers. These airports will meet all of the minimum design standards of Group I and II and. Airports with scheduled commercial passenger service will meet the minimum requirements of FAR Part 139.

B. All main runway(s), taxiways/taxilanes and apron areas will be paved.

C. All runways and taxiways will be lighted. Transient and local tiedown facilities will be lighted in the main terminal area.

D. Have the following minimum Terminal Facilities: on location weather data terminal; fuel facilities to accommodate both piston and jet aircraft; either commercial eating facilities or vending machines; access to rental car facilities; maintenance facilities for the repair of aircraft, avionics, engine and airframe; and a waiting/lounge area. (NOTE: Some or all of these services may be provided by the FBO's however, the airport sponsor is responsible for monitoring the condition of mandatory facilities.)

E. In addition, the following equipment may be authorized for this type facility: Crash-rescue equipment, Runway sweeper, landscaping tractor, and Snow-plow.

F. Emergency generating equipment for the Beacon, Runway Lights, Visual Approach Aid, ATCT (optional), and emergency equipment.

G. A nonprecision instrument approach to the main runway ends.